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ABSTRACT

The study determined if there is a significant difference between the amount and quality of technological knowledge held by the American Indian students as opposed to non-Indians in the 4th, 5th, and 7th grades. Also, do these Indian students possess this technological information in a form which can be used, or is it in a state of unrelated abstractness? Two tests were designed to determine whether technological differences were a factor which influenced the Indian's downward trend in academic achievement, 1 a verbal test, and the other a picture association test. Each test had 7 subtests on basic concepts concerning technological knowledge. Selection of subjects for this study resulted in matching a total of 60 Indian and 60 non-Indian students in the following areas: (1) age, (2) IQ, (3) grade level, and (4) sex. There were no significant differences in the Indian and non-Indian students at the 4th, 5th, and 7th grade levels on all subtests except one. Another finding was that the 5th grade level had 3 subtests which were significantly different. They were home community, and job subtests. The remaining 4 showed no significant difference. The better scores were made by non-Indians. (FF)

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A COMPARISON OF TECHNOLOGICAL INFORMATION EVIDENCED IN SELECTED INDIAN AND NON-INDIAN CHILDREN

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A Project Paper

Presented to

Dr. John Moss

Northern State College

Aberdeen, South Dakota

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Master of Science

by

Ed Maurin

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CHAPTER I

INTRODUCTION

The Sioux Indian manifests behavioral symptoms (problems) similar to other minority ethnic groups. These symptoms are exhibited in academic and life failure. Several researchers have studied these problems, but seldom produce evidence indicating the causes or the basic relationships involved due to contributing factors. Such information would be helpful in attempting to resolve the real problems and reduce their impact.

It is the intent of this investigator to examine some of the basic relationships by projecting current cultural and educational problems, as indicated by research of Sioux Indians, onto a backdrop of (1) past Indian value systems, (2) current Indian educational practices and, (3) future non-Indian societal demands as they affect the Sioux Indian. It should be pointed out here that each of these factors has been researched in isolation, but this has been done without giving sufficient attention to any factor which might span all of these areas, thus, providing a picture which would have relevance to the present composite Indian situation.

Futhermore, this investigator intends to examine in detail one suspected contributor for such generalized,

stultifying problems found in the Sioux Indian population. This is a lack of awareness of basic technological data. An assumption was made that awareness of basic technology is fundamental for successful participation in a technological society. The crucial question is: Does the Sioux Indian possess this information in adequate amounts and over a broad enough range? Hopefully, this investigation will point out new realistic relationships which can be used to formulate the Sioux Indian's past experience, his current experience, and the projected future expectations as they relate to technological knowledge and change which can give new direction and success to the Indian people.

I. THE PROBLEM

Statement of the Problem

Many researchers have studied the "cross-over" phenomenon. They have determined that the majority of Sioux Indian students achieve at normal levels during the first four years of school. Then, suddenly many of these students fall significantly below the average achievement levels as indicated by the California Achievement Tests and other similar standardized instruments. Furthermore, research shows that this appears to be the beginning of a downward spiraling trend which continues unchecked, many times, throughout adulthood.

The problem is: What are the contributing factors that produce these conditions, and is technological knowledge "a major one?".

The Purpose of this Study

The purpose of this study is to determine if there is a significant difference between the amount and quality of technological knowledge held by the Indian students as opposed to non-Indian students at the fourth, fifth, and seventh grades. Also, do these Indian students possess this technological information in a form which can be used, or is it in a state of unrelated abstractness?

This investigator's curiosity concerning the "cross-over" phenomenon and the above mentioned questions sets the purpose for trying to determine what is happening to these Indian students in particular, and all Indian people in general.

II. METHODS AND PROCEDURES USED

An effort was made to compare the technological information evidenced in non-Indian children of the Aberdeen public school system and a similar group (same grades) of Indian students from the Fort Thompson School.

The instrument used in acquiring this information was constructed by this investigator. Two hundred multiple choice non-verbal questions were constructed and presented to a jury of five graduate students who have had extensive

experience in Indian education. The jury selected forty-nine items from each category (verbal and non-verbal). These items were then arranged in what appeared to be a sequential order of difficulty.

The completed test instruments (verbal and non-verbal) consisted of seven categories with seven items in each category. The categories are as follows: home, community, health, transportation, education, work, and communications. The seven items in each of these categories range in difficulty from about the third grade level to about the ninth grade level. There are two items for the low level, three items for the intermediate level, and two items for the highest level.

Two forms (verbal and non-verbal) were given to the students in the fourth, fifth, and seventh grades. The classes were divided in half by giving every other student either a verbal or non-verbal test.

The instrument was administered by this investigator to the fourth, fifth, and seventh grades at Aberdeen, South Dakota and Fort Thompson School at Fort Thompson, South Dakota.

Results of these tests were recorded and subjected to statistical analysis.

III. DEFINITIONS OF TERMS

Technological Knowledge

Technological knowledge includes the mechanisms or

processes involved in doing a job. The concept of technological knowledge should indicate that these mechanisms or processes have or will undergo change in an evolutionary manner.

"Cross-over" Phenomenon

"Cross-over" phenomenon is the process of change that many Indian students experience when they stop achieving normally and then for some unexplained reason fall far below the normal achievement level. This usually occurs between the fifth and seventh grades.

Standardized Tests

Standardized tests are measuring devices which have established norms or standards of achievement for a specific series of school grades.

IV. DELIMITATION OF THE STUDY

This study was limited to the results obtained through the testing of twenty fourth grade, twenty fifth grade, and twenty seventh grade Indian students at the Fort Thompson School, Fort Thompson, South Dakota, and twenty fourth grade, twenty fifth grade, and twenty seventh grade non-Indian students of the Aberdeen Public Schools, Aberdeen, South Dakota.

CHAPTER II

REVIEW OF THE LITERATURE

A review of the literature indicates that there may be many factors which contribute to the problems of the Sioux Indians. Many analyses have been based upon education, economics, tribal factionalism, administration and other disturbing factors on the reservation.[1]

For the most part, the research efforts have provided information in the form of descriptions of situations or things, rather than drawing meaningful relationships. Therefore, it should be kept in mind that this investigator made a conscious effort to cite materials which on the surface may seem inappropriate, but upon further investigation show a great deal of relevancy and interrelatedness.

For example, there is a considerable amount of literature concerning the strengths and weaknesses of Indian students in the areas of social competency, academic achievement, and job ability. There is even more information about the effects of technology on the future American society of which the Indian is a part, and there is a reasonable

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[1] B. Medicine, "The Changing Dakota Family and the Stresses Therein" (paper included in the Pine Ridge Research Bulletin, Bulletin No. 9, June, 1969, Pine Ridge, South Dakota).

amount of information concerning the effect of Indian traditions and value systems on the Indian elementary school child. The crux of the whole matter is that all of these things, which may seem unrelated, are focusing upon the child at about the fourth or fifth grade.

This is the time (fourth and fifth grades) that the Indian values of the past are coming into greater awareness, but not into perspective. This is also the time when there is a definite change in the academic materials which tend to change the emphasis by using texts that use a "comprehension" vocabulary rather than a "talking" vocabulary which was previously used.[2] Due to this factor alone, there might be confusion because of a different frame of reference which does not match adequately enough to provide good understanding to take place. All of these factors are probably working simultaneously on the child in the fourth or fifth grade, mainly because of the misunderstood technological concepts that are reaching down and affecting everything he attempts. The teacher has proven ineffective, in most cases, to deal with this dilemma, mainly because she probably doesn't realize what factors are in operation.

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[2]Brewton Berry, The Education of American Indians: A Survey of the Literature (Washington: Committee on Labor and Public Welfare, United States Senate, 1969), p. 56.

The materials that follow are organized in such a way that a new perspective of the Sioux Indian and his problems is to some extent indicated.

I. SOCIAL COMPETENCIES

How the Indian Views Himself

This investigator thinks that it is important to look at "how the Indian views himself" by (excess) citing the feelings of high school students and post high school students, and then indicate how these feelings are really an extension of previously formed feelings of the early teenage years. Therefore, the presentation of materials will be from older to younger, or at least to early teen years.

The majority of the Indian students claimed peer group association did not affect either their achievement in classes or plans to continue education beyond the high school level. When the peer group did affect the decision of an individual, such affect usually was positive and beneficial. The influence of peer groups on individual members is much less significant than it is generally thought to be.[3]

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[3]U. S., Congress, House, Committee on Labor and Public Welfare, Subcommittee on Indian Education, The American Indian Graduate: After High School, What?, Hearing, Ninety-First Congress, 1st Session, 1969 (Washington Government Printing Office, 1969), p. 1280.

Indians are aware that their communities and people are held in low esteem by the general society. They wish to remain Indian, but do not want the low-status equivalent. They want to retain a way of life with values Indians consider superior to those of the general society, but also want to take advantage of the modern technological advances, and attain a reasonable material standard of living.[4]

A minority of about one-fifth of the graduates admitted they had never experienced prejudice directed against them. They were all readily able to relate experiences of friends and relatives who were victims of prejudice. Curiously, the respondents seemed to feel that if they admitted experiencing prejudice, they were admitting inferiority to other people. Such are the results of a young lifetime, not necessarily of overt prejudice, but of prejudice framed on a stereotype.[5]

One-third of the high school graduates defined "success" in terms of personal happiness. The remainder, reflecting the struggle for survival, defined success in terms of holding a good job and/or possessing a good

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[4]U. S., Congress, House, Committee on Labor and Public Welfare, Subcommittee on Indian Education, The American Indian Graduate: After High School, What?, Hearing, Ninety-First Congress, 1st Sess., 1969 (Washington Government Printing Office, 1969), p. 1284.

[5]Ibid., p. 1281.

education. More females than males thought of themselves as successful. This is normal since females equate success with a satisfactory marriage. However, males, the providers, equate success with secure, well-paying jobs which also afford them personal satisfaction. More of the graduates thought of themselves as unsuccessful, than characterized themselves as successful.[6]

Many Indians fear material progress that evidences the beginning stages of control of their own affairs. They claim that when a tribe approaches autonomy and a reasonable standard of living, those governing in our society pressure Indians to join the mainstream of society. Soon the tribe finds itself a victim of "termination" and has lost all that it sweated and sacrificed to retain and build.[7]

No doubt, all of these factors, which are essentially technologically influenced, tend to be projected down to the student in the intermediate grades, either through actual observation or inferred reasoning. Therefore, what Dr. Bryde terms as the beginning of Indian awareness, "that he is Indian and different," really may have its roots established

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[6] U. S., Congress, House, Committee on Labor and Public Welfare, Subcommittee on Indian Education, The American Indian Graduate: After High School, What?, Hearing, Ninety-First Congress, 1st Sess., 1969 (Washington Government Printing Office, 1969), p. 1281.

[7] Ibid., p. 1284

in the older generation (high school age and above).

Dr. Bryde explains what the young Indian feels as they enter into this awareness stage. The explanation follows:

> It is only when a young Indian gets to be about a teenager that he starts really becoming aware of the differences between his Indian culture and the non-Indian culture. One of the reasons for this is that, as he becomes a young adult, he begins to develop adult wants and desires, which he did not have when he was a child. All a child wants is enough to eat, time to play, security, enough clothes, and a place to sleep. The adult wants and desires which begin to rise in a teenager include not only thoughts of marriage in the future, a decent job, and a house to live in, but acceptance of himself by all men as a person. For the first time, then, he becomes really aware of the differences between being an Indian and being a non-Indian. The first thing that strikes him is that he is usually much poorer than the average non-Indian. He becomes aware of the fact that the type of person that the non-Indian culture appreciates and admires is the one with a lot of money, big cars, and big houses. The kind of activity that is appreciated by the non-Indians' culture is money-making activity. It slowly dawns upon the average Indian teenager that he, being poor, does not live up to the norms of success (wealth) of the dominant culture. Since he is not the kind of person they think is important (rich), he thinks that they do not think that he is important and, therefore, not much good. This is how the young Indian interprets the picture that the dominant culture has of him. Since he perceives that the dominant culture does not think that he is important, he perceives (interprets) that they are not accepting him as a person, which is one of his most important rising wants as a young adult. After awhile, he can even start believing this himself and start to think that he is not much good.[8]

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[8] John F. Bryde, Modern Indians (John F. Bryde, 1969), p. 391.

Thus the thinking of the young Indian might go like this: "I have taken into myself my perceived image of myself from the dominant group, and (a) since you think I'm no good, (b) I guess I am no good, and (c) since I act according to my self image, I start to act no good. I act according to the way people expect me to act, and if they expect me to act no good, I will act no good."[9]

II. ACADEMIC ACHIEVEMENT

Grade Level Achievements

One aspect of scholastic achievement which has received considerable attention is the difference in scores for the various grade levels. It has long been believed by many whites that Indians, by their very nature, soon reach a learning plateau. There is some evidence that this is true, but the reasons are more complex than earlier educators suspected. Peterson, found that "the fourth grade group made consistently better scores in comparison to standardized norms and in comparison to public school non-Indians, than Indian pupils in the upper grades," and subsequent studies have tended to bear him out.[10] Coombs, discovered that

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[9] Ibid., p. 393.

[10] Brewton Berry, The Education of American Indians: A Survey of the Literature (Washington: Committee on Labor and Public Welfare, United States Senate, 1969), p. 22.

"Indian pupils compared much more favorably with white pupils in the elementary grades, and particularly in grade four, than in the junior and senior high school grades." Among others who have found a break in achievement between the fourth and fifth grades are Rist, Safar, Loyd, Uhlman, and Dorn.[11]

Other investigators would put the break, if there is one, at some other level. On the Pine Ridge Reservation Wax found children in the lower elementary grades "attentive, busy, and happy," while those in the intermediate grades presented a sharp contrast and appeared to be "shy, withdrawn, stupid, and sullen."[12] Departing most radically from the conventional view is Bryde, who studied a total of 415 Indian and 223 white adolescents at Pine Ridge, and concluded, "On achievement variables the Indian students scored significantly higher than national test norms from the fourth through the eighth grade. At the eighth grade level, the Indian students were significantly below national test norms."[13]

"Cross-over" Phenomenon

There is no denying the fact that academic performance for Indians declines as they move through the school, but the cause of this so-called "cross-over" phenomenon is

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[11] Ibid., p. 22.

[12] Ibid., p. 22

[13] Ibid., p. 22.

difficult to determine. Some maintain that it is characteristic of adolescents, and not peculiar to Indians. Kayser did a study of 207 students--Ute, Anglo, and Spanish-American --in a Colorado public school, and found that the three groups, while unequal in performance, followed roughly the same pattern. A few have maintained that the superior performance for Indians in the early grades is a tribute to the skill of the teachers of those grades. Peters, seeking to account for the "cross-over" phenomenon among the Hopi, supposes it is a result of the acculturation process.[14]

> The Hopi have become partly acculturated, especially in the most general aspects of American culture. The younger children are quick in learning these most obvious elements of the culture, in school, movies, radio, and through occasional visits to the city. However, for the older child, the broad culture experiences, with their varied nuances, are not available. Furthermore, the increasing Hopi cultural emphasis denies the child the same opportunities available to the children of the general population.[15]

Still others suspect that the explanation lies in the language. Blossom addresses herself to the problem: "There must be some underlying reason for the widespread belief that retardation starts at the fourth-grade level." She suspects that the cause may lie in the fact that people "have two vocabularies, one composed of words used in

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[14]Ibid., p. 23.

[15]Ibid., p. 23

speaking, and a much larger hidden one called a recognition or comprehension vocabulary." Elementary texts, she explains, are written in a carefully controlled "talking vocabulary," while upper grade texts shift to a comprehensive type vocabulary. This shift affects especially the bilingual pupil, and Blossom hints that "there may be a relationship between this shift and retardation."[16]

Another explanation of the "cross-over" phenomenon is psychological. Bryde, among others, maintains the alienation is the central concept for explaining that problem. Conflict between white and Indian cultures comes to a focus at adolescence and causes severe personality disturbances which block achievement. In view of the fact that Indian pupils tend to be over age, it may well be that adolescence arrives during the intermediate elementary grades, bringing with it problems of identity, alienation, and negative self-feelings, which manifest themselves in low achievement.[17]

High and Low Areas of Achievement

It appears that on their achievement tests Indian pupils do relatively better in certain areas than others. However, it is difficult to generalize or to draw definite conclusions, since the various studies have used different

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[16] Ibid., p. 23.

[17] Ibid., p. 23.

instruments and criteria. Peterson, noted "the relatively high achievement of Indian students in arithmetic," which surprised him, since arithmetic concepts and ideas were not emphasized in Indian culture, and he attributed such achievement to the educational program. Coombs, however, found that Indians compared very favorably with whites in arithmetic fundamentals, but very poorly in arithmetic reasoning. Lloyd, on the other hand, found that they scored rather low in both areas. Blanchard, too, reported the North Dakota Chippe was "noticeably below" others in the public schools in arithmetic reasoning. The Indian's superiority in spelling has been reported by Coombs, Safar, Lloyd, and Dorn. Uhlman found the New Perce "measurably inferior on tests of linguistic and verbal skills," but reports that differences disappeared on non-linguistic and performance-type tests. Coombs, discovered the Indians did poorest of all on reading vocabulary, and similar findings are reported by Blanchard, Rist, Uhlman, and Deissler. While the data are somewhat conflicting and inconclusive, it does appear that Indian pupils do best in those areas which are learned in the school situation and by rote method, such as spelling and computational skill in arithmetic, and they do less well in those areas involving quantitative thinking, vocabulary, reading

comprehension, language usage, etc. Their restricted background, and poor technological frame of reference is obviously responsible for their shortcomings in these latter areas. Regrettably, they do poorly in those skills which are most important for scholastic success.[18]

III. JOB ABILITY

Post High School Jobs

The Selinger study reports that out of 287 respondents, 70 percent entered into some type of post high school program, but only 52 percent of these actually completed a program. Most of these students did not complete the programs they initially entered. The large majority completed technical-vocational rather than academic programs. Of the students interviewed, there were no graduates or potential graduates in the traditional "prestige" professions such as medicine, law, or engineering.[19]

Approximately six years after high school graduation, slightly less than one-half of the females and slightly more than one-half of the males were employed for pay or

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[18] Ibid., p. 23.

[19] U.S., Congress, House, Committee on Labor and Public Welfare, Subcommittee on Indian Education, The American Indian Graduate: After High School, What? Hearing, Ninety-First Congress, 1st Session, 1969 (Washington Government Printing Office, 1969), p. 1276.

profit. The majority of the graduates were working in low-skill, low-pay, low-interest, non-permanent type jobs. Three-fifths of these young people were living on or near a reservation.[20]

Economic status did not appear to be the major determinant in either entrance into or persistence in a post high school program. About one-half of those who discontinued an initially-entered program resumed in the same or a different program. They did so because they felt the need of further education either to improve themselves or to gain a good job.[21]

Two-thirds of the males accepted employment unrelated to their training. Most who accepted this type of employment did so because they wished to live on or near their home reservation. The same attitude characterized the job-holding non-persisters of whom 90 percent live on or near a reservation. For these people, there is a very limited choice of employment.[22]

IV. CURRENT DIRECTION IN INDIAN EDUCATION

Most Popular Programs

The most popular program entered by girls at public

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[20] Ibid., p. 1276.

[21] Ibid., p. 1276.

[22] Ibid., p. 1277.

technical-vocational schools and at private technical-vocational schools was secretarial; at federal technical-vocational schools it was business education, closely followed by home economics; at universities, liberal arts was the most popular followed by education; at junior colleges, home economics and secretarial programs were equally popular.[23]

The boys first selected mechanics at the public technical-vocational schools, which enjoyed popularity at the private technical-vocational schools. At the Federal technical-vocational schools, mechanics was also the most popular program. For males at universities, business education and education were equal as first choices followed by liberal arts. Liberal arts was the most entered program at junior colleges followed by agriculture and business education as equal choices.[24]

Reasons for Selecting a Program

The Selinger report stated that when students were asked why they selected a particular post high school program to enter, respondents frequently were vague in their replies or had multiple reasons for their decisions. Almost one-half, 48 percent, of the females replied they

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[23] Ibid., p. 1222

[24] Ibid., p. 1222

selected a particular program because it interested them. Fourteen percent selected their training on the advice of a counselor, 10 percent on the advice of a friend, 9 percent because there were no openings for applicants in the program they preferred, 6 percent because such a selection presented the easiest course of action available to the student. The remainder, each category representing less than 3 percent of respondents, selected a particular program because of lack of financial assistance, the training led to a white collar job, the training offered job security or the short term of training required appealed to the student.[25]

The majority, 57 percent, of male respondents indicated they entered a training program because it interested them, 9 percent because the training offered job security, 9 percent because of the advice of a counselor, 5 percent because of no openings for applicants in the training they preferred, 4 percent on the advice of friends. The remainder, each category representing less than 2 percent of the respondents, selected a particular program because the training led to white collar jobs, it was the easiest course of action to follow, or the training period was of short duration.[26]

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[25] Ibid., p. 1223

[26] Ibid., p. 1223

Effects of Encouragement

According to the Selinger report, over one-half of the high school graduates possessed less than adequate information on post high school educational opportunities on which to base decisions on their future. The exception to this was the male non-persister. He apparently favored other factors over this information when arriving at a decision. Less than one-third of the Indian students graduating from high school had adequate information on post high school educational opportunities.[27]

The sources and amount of information the graduates had available to them on post high school employment opportunities were considerably less than on post high school education opportunities.[28]

More of the non-persisters and male persisters, as well as a sizeable percentage of the female persisters, rated receiving a diploma as the best thing done for them by their high schools. When considered with the number of graduates who felt nothing was done best for them by their high schools, a considerable percentage of these young adults appear disillusioned and frustrated by the contribution of formal education to their adult life. These

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[27] Ibid., p. 1256

[28] Ibid., p. 1257

young people have been oversold on the value of graduating from high school; they have found a diploma does not automatically unlock the doors to a multitude of golden opportunities. The emphasis of the school and the home has been too much on what a "union ticket" a high school diploma is. Insufficient stress was placed on the contribution of an education to individual development as a human being. Nor has there been enough emphasis placed on the fact that the better opportunities for future interesting and secure jobs are open to those who regard acquiring a high school diploma as the first major step in paving the way into future education or training programs.[29]

Many of the graduates, 31 percent of the males, 42 percent of the female non-persisters, and 28 percent of the female persisters, did not have any suggestions on what they could change in the high schools they attended. Most of these young people have not been trained in or made aware of the potential changes possible in schools. They perceive themselves as powerless to bring about changes and have not speculated on those they make.[30]

Of those graduates who did have suggestions, the females most often mentioned more adequately trained

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[29] Ibid., p. 1260

[30] Ibid., p. 1261

teachers while males most often mentioned more offerings in vocational education. However, when asked which was the most important or urgently needed change, 32 percent of those replying indicated more adequately trained teachers.[31]

Most frequently mentioned next was more emphasis on academic subjects. This was also listed as the second most important change needed by all except the male persister. A higher percentage of male persisters listed more offerings in vocational education as the second most important change needed in high schools than listed heavier emphasis on academic subjects.[32]

The largest percentage of responding graduates cited lack of encouragement at home as the major cause of dropping out of school. Lack of encouragement from the school also ranked high as a major dropout cause. Fewer graduates mentioned this reason, however, than indicated a lack of desire or interest of the individual to continue an education. Many factors contribute to lowering the interest or desire of a student to remain in school. Lack of encouragement from the home and school ranks as a major factor.[33] However, these may be symptoms of a more basic problem, that being

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[31] Ibid., p. 1261.

[32] Ibid., p. 1265

[33] Ibid., p. 1266.

a lack of adequate technological frame of reference.

Educational Perspective

At this time an effort will be made to relate the factors that have been discussed - social competencies, academic achievement, job ability, and current directions in Indian education - to the influence of future technology and technological evolution, and how this produces a compressing effect which projects down to the Indian student at the intermediate grade levels.

V. TECHNOLOGICAL EVOLUTION

It has been said many times that technology is the lifeblood of the economic system, just as bureaucracy is its nervous system. Technology, taken to mean organized knowledge and techniques, is neutral; that is, it is value-free, and its products can be used for general good or for general ill. Technology is a common resource, and the dominant fact of our lives. Changes in tools and techniques produce (violent) changes in political and social relationships.[34]

We have observed this violent change influencing the Indian. However, we have not brought about a solution

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[34] Charles R. Walker, Modern Technology and Civilization (New York: McGraw-Hill Book Company, Inc., 1962) p. 443.

for his problems. For the most part we have not included technology as a contributing factor--one with wide spread influence and deep roots.

The following paragraphs will indicate what is taking place in our society's technological evolution. It should be remembered that this is an on-going process which never ceases!

Technological Evolution Society

The evolution of industrial work can be defined as the passage from a system of skills to a technical system of work. During phase A the top category of industrial workers, the craftsman, possess a skill, and intervene directly and according to their particular and personal methods of work production. However subject to an economic and social system he may be, the worker possesses job autonomy, a vocational stronghold, and in his demeanor and attitudes to his work testified by his independent actions to this aspect of his job. If the notion of pride of workmanship makes sense only in certain historic, well-defined, social conditions which permit relations between the worker and the user of the product, nevertheless the craftsman, in regard to his work, takes an attitude largely independent of its social circumstances. This is true because the worker is directly and physically involved

in that work. It is his cleverness, the rapidity of his reflexes, his visual, auditory, and tactical sensitivity that operates the machine or tool, and, quite as much as his technical knowledge, determine the quality of his workmanship. It is because of his strength, his good sense, his rhythm of work, the rapidity of his reflexes that are constantly and directly put into play, even in planning his job, that the task possesses for him a certain autonomy.

Consider now the last phase of the job evolution (C), and observe that the worker no longer actively intervenes in the manufacturing process. He superintends, he records, he controls. His job can no longer be defined as a certain relationship between man and materials, tools, and machine, but rather by a certain role in the total production picture. In a system dominated by technology most aspects of skill are now absorbed into the social aspects. The rhythm and character of the work is no longer determined by nature of the product manufactured, or the machine utilized, or by the character of human effort, but by the way in which the work is "organized." Whether or not the worker is qualified for the job depends now on his capacity to integrate himself into the social group and to responsibility.

It is not a paradox to say that the new system of work, precisely because of its technology, is entirely social

and organizational. For the workers, the work possesses a direction and value which depends entirely on social factors, a situation which is the opposite of that in which craftsmanship predominates. At this stage (C) an attitude which reflects simply the job as such no longer exists.[35]

During phase B while the values of skilled work are being in effect destroyed, the debris of the old system has not yet been eliminated, and a very large number of men are being held down to work of an extremely simple, repetitive nature, often nothing more than machine tending, such as characterizes the big mechanized manufacturing industries, particularly textiles. But if the importance of monotonous over-specialized work is evident, one cannot conclude from this that the job itself is an autonomous factor in the work situation.[36]

From the principles that have been defined we can deduce a certain number of consequences which merit special study, especially for the Indian student preparing for a job.

Some of these principles are: (1) The subordination of those aspects of the job concerned with skill to the social and organizational aspects, rules out of phases B and C the illusion of the technocrats. That in the course of the

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[35] Ibid., p. 430

[36] Ibid., p. 430

development of industry the role of the technician will be increased is incontestable, but output and productivity depend more and more on organizational and social factors, the "climate" of the enterprises, and above all on the attitude of the workers to their work. The relations between the technician and the workers are an important element in this climate, but its amelioration supposes the overcoming of all narrow managerial ideologies between technicians and the workers, an accomplishment which would actually contribute to technical efficiency. To consider a plant from a purely technical point of view is in opposition to different groups playing the social role which is now theirs and yet this role in a large measure governs the progress of productivity. Thus the evolution of technology condemns the technocrat spirit when it is invoked unduly.[37] (2) More important, and more positive, are the repercussions of the suggested principles on vocational training. Beyond simple job training, vocational instruction strives to give apprentices a real understanding, in a rational form, of the process which will permit the worker to adapt to a wide variety of skilled work. But this clashes with the brutal reality of millions of unskilled or semi-skilled jobs which require no general vocational training.

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[37] Ibid., p. 430.

Some honest observers even ask themselves if the good intentions of the educator do not tend to aggregate the difficulties of subsequent adaptation by accentuating the opposition which exists between the aspiration for a true skill or craft, and the usual trivial job in industry. The nature of phase B and phase C suggests that this difficulty comes from opposing to the real character of work in these periods the mythical ideal of the craftsman of place A.[38]

VI. SUMMARY

Taking into account the evidence presented previously in this paper, it does not stretch the imagination any to say that the course which the Indian is on is one of ultimate disaster. In brief form, here is the progression that the Indian is taking:

Starting from the influence of the value system held by the Indian and progressing to the "cross-over" phenomenon, to the school dropout phase that displays social failure, school failure, and later, job failure, we now arrive at the point of deciding what influence technology has on all of these.

It appears from the analysis of the role of technology

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[38] Ibid., p. 432

in our society that everybody is influenced by it and will continue to be more and more. As far as what we are doing in Indian education is concerned, it appears that the de-emphasis of academics, which has already taken place, is not the right direction to go; neither is the tremendous thrust toward vocational-technical training desirable; and finally, the attitude of the non-Indian to expect less from the Indian because he is incapable is least of all desirable.

CHAPTER III

DATA AND TREATMENT OF DATA

This study was designed to determine if there might be a significant difference between the amount and quality of technological knowledge held by the Indian students as opposed to non-Indian students at the fourth, fifth, and seventh grade levels.

Selection of subjects for this comparative study resulted in matching a total of sixty Indian and sixty non-Indian students in the following areas: (1) age, (2) IQ, (3) grade level, and (4) sex.

The two matched groups of Indian and non-Indian students were selected from the fourth, fifth, and seventh grade levels. Each grade level, fourth, fifth, and seventh had twenty Indian students and twenty non-Indian students. Half of the group of twenty Indian students for each grade level were given the verbal technology test and half took the picture-association technology test. This selection was made at random for each grade level tested.

The same procedure that was described above was applied to the selection of non-Indian students to determine whether they took the verbal test or the picture association test.

A comparison of the Indian and non-Indian groups was made by applying statistical analysis to the data supplied by the tests of the one hundred twenty subjects.

The t-test was applied to each subtest of the verbal and picture-association tests to determine if there were significant differences between the two groups, Indian and non-Indian. Also, see tables 1 and 2 in the appendix.

The information that follows describes the verbal technology test and its subtests, and the picture-association test and its subtests.

Description of Verbal Test

The reliability factor of this test was r=.782 as determined by the Kuder-Richardson "20" formula.

The verbal technology test has seven subtests that were designed to test technological items in the following areas: (1) Home, (2) Community, (3) Health, (4) Transportation, (5) Communications, (6) Job, and (7) Science and Education.

The student was to select the response which he felt best answered the conditions of the statement or question. All of the possible answers had a time orientation quality which denoted either past, present, or future frame of reference. It was assumed that this frame of reference was, to some degree, a reflection of their environmental influences. The possible answers also had logical and illogical properties which tested the conceptual understanding of the students. This test appears in the appendix.

Home subtest. This test was designed to test technological knowledge representing a home setting.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian students at the fourth and fifth grade levels. However, there was a significant difference (.01 level of confidence) at the seventh grade level.

Community subtest. This subtest was designed to test technological knowledge representing a community setting.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian students at the fourth, fifth, and seventh grades.

Health subtest. This subtest was designed to test technological knowledge representing the maintenance of good health.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian students at the fourth, fifth, and seventh grade levels.

Transportation subtest. This subtest was designed to test technological knowledge representing transportation facilities.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian students at the fourth, fifth, and seventh grade levels.

Communications subtest. This subtest was designed to test technological knowledge representing communication facilities.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian

students at the fourth, fifth, and seventh grade levels.

Science and education subtest. This subtest was designed to test technological knowledge representing mechanical and electronic devices used in modern day classrooms, and science concepts taught in the first seven grades.

The comparative results of the t-test indicated no significant difference between the Indian and non-Indian students at the fourth, fifth, and seventh grade levels.

INTERPRETATION

A possible interpretation of these conditions could indicate that vocabulary and conceptual development have taken place in these areas of technology at about the same rate in both populations. However, this question remains in the investigator's mind. How do seemingly different environmental backgrounds produce children with such similar patterns of response with regard to these areas of technological knowledge? One possible reason might suggest that the Indian student might be more aware of these technological concepts because they have been exposed to them through formal learning situations rather than from being a natural part of their environment. The converse is true for the non-Indian because his exposure to these concepts is less formal, but common place. Therefore, there might be a leveling effect occurring here which seems to be indicated by this test. This is to say that the test is measuring the acquired awareness of technological

knowledge of the Indian which is probably relatively recent information. The non-Indian has approximately the same amount and quality of technological knowledge but has acquired it by casual observation of things around the home, community, etc., over a long period of time. The level of awareness of these two groups appears to be very similar. It appears that the Indian student's knowledge is more recent but it is nevertheless somewhat incomplete in certain areas (home and community technology). On the other hand, this is in contrast to the non-Indian's awareness which appears stale and incomplete because he does not seem to have the theoretical organization of technological relationships that the Indian has. Thus, it appears that he has only dealt with technology in a way that is superficial and commonplace.

The Indian students responded with fewer bizarre answers than the non-Indian students. A question concerning reasoning ability of these students might be brought forth with regard to this observation. If the assumption is correct that the Indian students have acquired formal exposure to these technological concepts, then their ability to handle the reasoning process probably would be more logical and appropriate than if exposure was commonplace. Thus, there is a positive reason for the noticeable difference between the frequent bizarre responses of the non-Indian as opposed to the less frequent bizarre responses of the Indian.

Picture Association Test

The reliability factor of this test was r=.932 as

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determined by the Kuder-Richardson "20" formula.

This test was designed to test the technological knowledge of Indian and non-Indian students with regard to their ability to associate pictures which had a functional, spatial, or time relationship. This, of course, demanded knowledge of the pictures and something more than mere recognition or identification. This test appears in the appendix.

The picture association test has seven subtests that were designed to test technological items in the following areas: (1) Home, (2) Community, (3) Health, (4) Transportation, (5) Communications, (6) Job, and (7) Science and Education.

Home picture subtest. The comparative results of the t-test indicated no significant difference at the seventh grade level. However, at the fourth and fifth grade levels there was a significant difference at the .01 level of confidence. The non-Indian students made the higher scores.

Community picture subtest. The comparative results of the t-test indicated no significant difference at the seventh grade level. However, at the fifth grade level there was a significant difference at the .05 level of confidence according to the t-test. The fourth grade level showed a significant difference at the .01 level of confidence according to the t-test results. The better scores were made by non-Indian students at both grade levels.

Health picture subtest. The comparative results of the t-test indicated no significant difference at the fourth, fifth, and seventh grade levels.

Communication picture subtest. The comparative results of the t-test indicated a significant difference at the .05 level of confidence at the seventh grade level. The high scores were made by the Indian students.

The comparative results of the t-test indicated a significant difference at the .01 level of confidence at the fifth grade level. Again the Indian students had consistently higher scores.

The comparative results of the t-test at the fourth grade level indicated no significant difference between the Indian and non-Indian groups.

Job picture subtest. The comparative results of the t-test indicated a significant difference at the .05 level of confidence at the seventh grade level. The higher scores were attained by the Indian students.

The comparative results of the t-test indicated no significant difference at the fifth grade level.

The comparative results at the fourth grade level indicated that there was a significant difference at the .01 level of confidence as indicated by the t-test results. The Indian students made the higher scores.

Science and education. The comparative results of the t-test indicated that there was no significant difference at the seventh grade level.

However, the comparative results of the t-test at the fifth grade level indicated a significant difference at the .01 level of confidence. The high scores were made by Indian students. The comparative results of the t-test indicated no significant difference at the fourth grade level.

INTERPRETATION

The fact that there was no significant difference between the seventh grade Indian and non-Indian groups who took the home picture subtest might raise some interesting questions. Especially since the fourth and fifth grade non-Indian students did significantly better than the Indian students on this subtest.

The reasons for the above conditions might be explained in one or more of the following:

1. The thought processes of the two groups are similarly developed at the seventh grade level.
2. The Indian students at the fourth and fifth grades are not as capable of making correct responses in the area of technology tested. This is because it is doubtful that these students have been exposed to the items included in this subtest.
3. The Indian students come from homes that do not contain the numerous technological items that the non-Indian home has. Therefore, lack of experience with these items might be indicated by the test scores at the fourth and fifth grades.
4. The gap is filled between the fifth grade and seventh grade by means of something occurring in the Indian student's experience which brings him up to the level of the non-Indian student.

> The school experiences might have an influence in this area or possibly just more exposure is the answer.

There was no significant difference at the seventh grade level between the Indian and non-Indian groups who took the community picture subtest. This suggests a similar pattern to that of the home picture subtest. Especially since the non-Indian students received significantly better scores at the fourth and fifth grade levels. It is this investigator's opinion that the same or similar reasons caused the second pattern of responses that caused the first.

The health picture subtest showed no significant difference at the fourth, fifth, or seventh grade levels. This is fairly predictable since the emphasis on health conditions on the Indian reservation probably provides about the same amount and kind of exposure to medical technology as the non-Indian students receive.

The same can be said about the lack of significant difference occurring at the fourth, fifth, and seventh grades in the area of transportation. One could assume that exposure is about the same for both groups.

In the area of technological knowledge associated with communications there were significant differences between the two groups. The Indian students scored significantly higher. This might be explained by assuming that both Indian and non-Indian students are exposed to similar items and concepts in this area.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This investigation was made to determine if there was a significant difference between the amount and quality of technological knowledge held by Indian and non-Indian students at the fourth, fifth, and seventh grades.

This investigator hypothesized that one possible reason for many Indian students' sudden drop in achievement at about the fifth, sixth, and seventh grades might possibly be due to a deficient technological frame of reference. This, generally speaking, was not proven in this study.

There were two tests designed by this investigator to help determine whether technological differences were indeed a factor which might be influencing the Indian's downward trend in academic achievement.

One was a verbal test, and the other was a picture association test. Each test had seven subtests which were testing basic concepts concerning technological knowledge. The subtests had to do with the seven following areas: (1) home, (2) community, (3) health, (4) transportation, (5) communications, (6) jobs, and (7) science and education.

The results of the technological tests, verbal and picture-association, indicated a pattern of response that can be interpreted fairly easily.

For example, there were no significant differences in

the Indian and non-Indian students at the fourth, fifth, and seventh grade levels on the verbal subtests, excluding one subtest. That was the verbal Home subtest which proved to have responses significantly different in favor of the non-Indian students at the seventh grade level.

The picture association subtests presented a different pattern, however.

The Indian students made significantly better scores on the communication and job subtests; however, there were no significant differences on the five remaining subtests at the seventh grade level.

The fifth grade level had four subtests that were significantly different. The high scores were made by the non-Indian students. These were the home, community, communications, and science and education subtests.

The fourth grade level had three subtests which were significantly different. They were home, community, and job subtests. The better scores were made by non-Indian students. The four remaining subtests had no significant difference.

Conclusions

It is this investigator's opinion that the data indicates the possibility that the Indian students have gained a considerable amount of technological knowledge by keen observation and/or by formal exposure, probably in the school setting. If the former is true, it may be due to the

contrast between their environmental influences which is less technologically oriented than the non-Indian's. This would suggest that the vicarious, or perhaps even formal learning of technological concepts are impressive to the Indian. This may result because of a desire to fulfil the needs that have come about because of a deficient technological environment, or the Indian student may have many interests which are technologically based, for which no adequate reason has been given here. Whatever the reasons are, the Indian students show good observation powers and good logical thinking processes in the area of technology.

However, the converse is true with the non-Indian. Perhaps this is because there is no need for understanding these things. He accepts the modern day conveniences as a matter of everyday living, but seldom realizes their significance or relationship to his life. In short, the non-Indian student indicated on this test a great deficit in handling any technological concept which required a logical thought process to arrive at the correct answer. Either he knew the answer or he didn't, and when he didn't, the response was usually very bizarre. This was not the case with the Indian student.

Recommendations

The data from this research project shows areas of deficit with regard to the picture association test, but no significant deficit areas on the verbal tests. The

deficits occur in the areas of home, community, communications, and jobs.

It is this investigator's opinion that since there was not a similar deficit pattern in these areas on the verbal test, the Indian students, for the most part, have the vocabulary for the concepts; but due to the probable lack of actual experience or exposure to these concepts in real life form, are not able to readily recognize the relationships of technological concepts in actual object, or picture form.

One recommendation, then, would be to provide an enrichment program for the first five grades, designed to give the Indian students adequate exposure to the real-life situation of the non-Indian's society. This is particularly true with regard to the home and community settings.

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APPENDIXES

Table 1

VERBAL SUBTEST RESULTS
Seventh Grade

	Home	Community	Health	Transportation	Communications	Job	Education
NSD		X	X	X	X	X	X
NI	*	*	*	*	*		*
I						*	
SD	X						
				Fifth Grade			
NSD	X	X	X	X	X	X	X
NI	*		*	*	*		
I		*				*	*
SD							
				Fourth Grade			
NSD	X	X	X	X	X	X	X
NI	*		*	*	*	*	
I		*					*
SD							

NSD = No significant difference
NI = Non-Indian students
I = Indian students
SD = Significant difference
0 = Significant at the .05 level
* = Highest scores

Table 2

PICTURE SUBTEST RESULTS
Seventh Grade

	Home	Community	Health	Transportation	Communications	Job	Education
NSD	X	X	X	X			X
NI	*	*					
I			*	*	*	*	*
SD					0	0	
				Fifth Grade			
NSD			X	X		X	
NI	*	*		*	*	*	*
I			*				
SD	X	X			X		X
				Fourth Grade			
NSD			X	X	X		X
NI	*	*		*		*	*
I			*		*		
SD	X	X				X	

NSD = No significant difference
NI = Non-Indian students
I = Indian students
SD = Significant difference
0 = Significant at the .05 level
* = Highest scores

VERBAL TEST

1. Circle the letter which shows how a person can best wash dishes.

   A. Automatic dishwasher
   B. Dishpan
   C. Rinse under a faucet
   D. Garden hose

---

2. Circle the letter which you think shows the fastest way to cook.

   A. Wood stove
   B. Radar range
   C. Open campfire
   D. Electric skillet

---

3. Circle the letter which shows the best way to sew a dress.

   A. Treadle sewing machine
   B. Electric sewing machine
   C. Needle and thread
   D. Knitting needles

---

4. Circle the letter which you think shows the best way to mix a cake.

   A. Electric mixer
   B. Big spoon
   C. Hand egg beater
   D. Using hands

---

5. Circle the letter which shows the best way to wash clothes.

   A. Rub-board
   B. Wringer type washer
   C. Automatic washer
   D. River

---

6. Circle the letter which shows the best way to clean a carpet.

   A. Broom
   B. Hose and water
   C. Vacuum cleaner
   D. Dust mop

---

7. Circle the letter which you think shows the best way to take a bath.

   A. Bathtub
   B. Washtub
   C. Swimming pool
   D. River

8. Circle the letter which shows where milk comes from.

A. Milk bottle
B. Cow
C. Store
D. Milk carton

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9. Circle the letter which shows the most modern way to get from one floor to another in a new department store.

A. Escalator
B. Stairs
C. Small elevator
D. Ramp

---

10. Circle the letter which shows where sewage should be taken care of.

A. Modern treatment plant
B. River bank
C. Lake
D. Bury it

---

11. Circle the letter which you think shows the strongest material.

A. Cotton
B. Wool
C. Silk
D. Nylon

---

12. Circle the letter which you think shows the best way to dress for a valentine dance.

A. Western pants and shirt
B. Sports coat and dress pants
C. Tuxedo
D. Business suit

---

13. Circle the letter which shows the best way to take your girlfriend to a party.

A. Walking
B. Taxi
C. Horse
D. Motorcycle

---

14. Circle the letter which shows the best way to heat a big building.

A. Big coal burning stove
B. Fireplace
C. Fan
D. Furnace

15. Circle the letter which shows a modern treatment for cancer.

A. X-Ray
B. Steam bath
C. Tranquilizer drug
D. Bathing in the sun

16. Circle the letter which shows the best way to cool a house.

A. Garden hose
B. Fan in window
C. Open window
D. Airconditioner

17. Circle the letter which shows where we get clean drinking water.

A. Spring
B. Cistern
C. Water processing plant
D. River

18. Circle the letter which shows the type of light that is best for reading.

A. Indirect lighting
B. Incandescent light bulb
C. Florescent tube
D. Candle.

19. Circle the letter which shows how most air pollution is caused.

A. Cars
B. Smoking
C. Burning trash
D. A large crowd of people

20. Circle the letter which shows the best place to have a complete eye examination.

A. Dentist office
B. Optometrists office
C. Drivers license bureau
D. School

21. Circle the letter which shows the best way to get rid of trash.

A. Modern trash truck
B. Bury it yourself
C. Throw it in the river
D. Process it and use it for fertilizer

22. Circle the letter which you think shows the best way to get to town.

A. Walking
B. Bus
C. Car
D. Thumbing a ride

23. Circle the letter which you think shows the best way to go to Chicago.

A. Walking
B. Airplane
C. Train
D. Car

24. Circle the letter that shows how the most modern policeman patrols traffic.

A. Helicopter
B. Horse
C. Patrol car
D. Motorcycle

25. Circle the letter which shows the best way to cross the ocean.

A. Raft
B. Sailboat
C. Big ship
D. Small motor boat

26. Circle the letter which shows the instrument the pilot of a large airplane would use to prevent a collision with another airplane that is on the same course.

A. Radio
B. Radar
C. Compass
D. Thermometer

27. Circle the letter which shows the fastest way to get to the top of a mountain ski slope.

A. Chair lift
B. Mono-rail
C. Skimobile
D. Walk

28. Circle the letter which shows the best type of engine to power a space-ship from the earth to a distant planet.

A. Gasoline engine
B. Ion engine
C. Atomic engine
D. Solid fuel rocket engine

29. Circle the letter which shows the best way to study.

A. Record player going
B. TV going
C. Quiet
D. Many people in the same room

30. Circle the letter which shows the best way to tell how your voice really sounds.

A. Telephone
B. Stethescope
C. Tape recorder
D. Echo

31. Circle the letter which shows where electricity for a home comes from.

A. Battery
B. Light pole
C. Wall outlet
D. Power generator plant

32. Circle the letter which shows the hottest flame.

A. Kerosene lamp
B. Candle
C. Propane torch
D. Acetylene oxygen

33. Circle the letter which shows the material which conducts electricity best.

A. Copper
B. Wood
C. Plastic
D. Rubber

34. Circle the letter which you think shows the best way to tell how to keep food from spoiling.

A. Fruit cellar
B. Refrigerator
C. Drying in the sun
D. Fruit canned in jars

35. Circle the letter which shows the best way to calculate whether there will be enough food for all the people of the world.

A. Ask a friend
B. Check the store to see if they have enough food
C. Use a large computer
D. Learn the subtraction Process

---

36. Circle the letter which shows the best way to take care of a flat tire.

A. Drive the car on the flat to a service station
B. Use a jack to change the tire
C. Lift the car by hand while someone changes the tire
D. Call a wrecker and tow the car away

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37. Circle the letter which shows the best way to paint a large house.

A. Spray can
B. Small artist brush
C. Paint sprayer
D. Wire brush

---

38. Circle the letter which shows the best way to irrigate a large farm.

A. Garden hose
B. Open ditch
C. Paint sprayer
D. Automatic sprinkler system

---

39. Circle the letter which shows the best way to pour a cement foundation.

A. Porta-mix truck
B. Small cement mixer
C. Wheelbarrow
D. Flat conveyor belt

---

40. Circle the letter which shows the best way to dig a basement for a house.

A. Tractor with a backhoe
B. Pick and shovel
C. Box of dynamite
D. Post hole digger

41. Circle the letter which shows who takes care of your broken bones.

A. Dentist
B. Doctor
C. Father
D. Teacher

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42. Circle the letter which shows the best way to cut a thick piece of metal.

A. Wood saw
B. Hand hacksaw
C. Big pair of scissors
D. Aceytelene and oxygen torch

---

43. Circle the letter which shows the best way to listen to music.

A. Record player
B. Radio
C. Tape recorder
D. Attending the performance

---

44. Circle the letter which you think shows the best way to tell someone about New York City.

A. Show several snapshots
B. Listen to a tape telling about New York
C. Show a movie of N. Y.
D. Listen to a radio newscast about N. Y.

---

45. Circle the letter which you think shows the best way to tell someone in a distant city about the death of a relative.

A. Letter
B. Telephone
C. Telegram
D. Tell your neighbor

---

46. Circle the letter which shows the most convenient way of finding out what time it is in a large office building when the electricity has gone off and you have no wrist watch.

A. Find a person with a wrist watch
B. Radio
C. Telephone
D. Look out the window and see the shadow

47. Circle the letter which shows the best way of sending messages to a distant planet.

A. Telephone
B. Radio
C. Laser beam
D. Communication Satellite

---

48. Circle the letter which shows the instrument that would be used to call for help if you were 2,000 miles out on the ocean on a wrecked ship.

A. Search light
B. Telescope
C. Telegraph
D. Two-way radio

---

49. Circle the letter that shows how the modern policeman calculates how fast the speeder is going.

A. Compass
B. Radar
C. Speedometer
D. Mini-computer